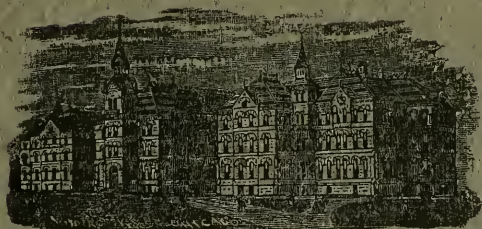


A GUIDE  
FOR  
THE CLINICAL EXAMINATION  
OF CHILDREN

BY  
H. G. HARDT, M. D.  
CLARA HARRISON TOWN, Ph. D.



THE LINCOLN STATE SCHOOL & COLONY  
H. G. Hardt, M. D., Superintendent

LINCOLN, ILLINOIS.

1912

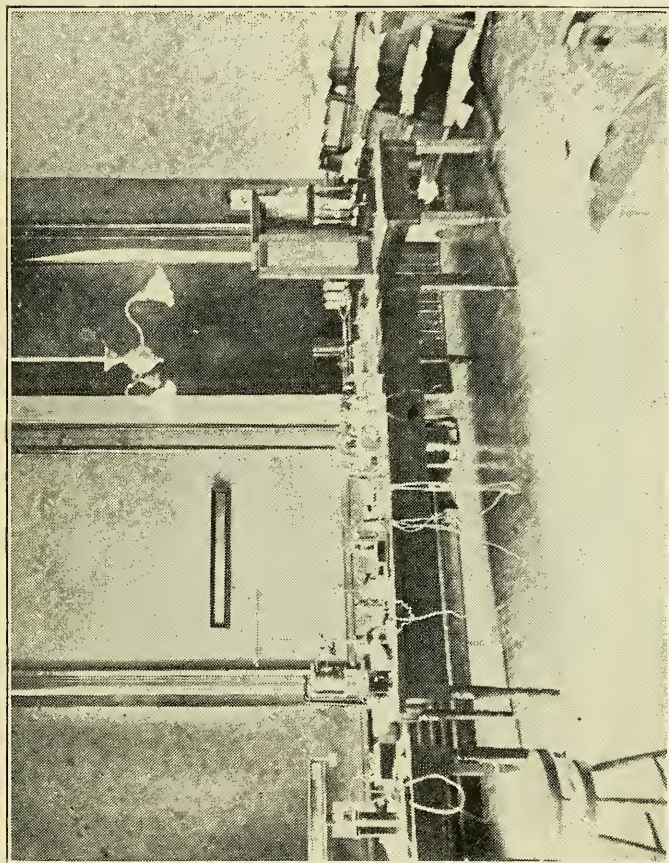
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CORNER OF PSYCHOLOGICAL LABORATORY





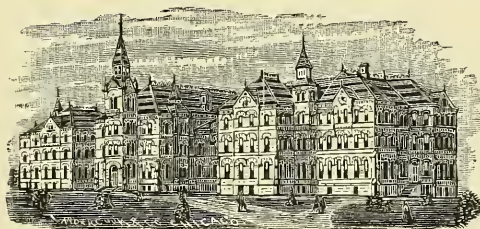
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# A Guide for the Clinical Examination of Children

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## INTRODUCTION

This syllabus is designed to furnish a guide for the examination and analytic study of atypical individuals, children primarily. It is divided into five parts, the first presenting an outline for the record of the subject's history, the second an outline for the recording of his characteristics and abilities as manifested during the first month or so of his institution life, the third an outline for the physical examination, the fourth an outline for the post-mortem examination, and the fifth explicit directions for the mental examination.

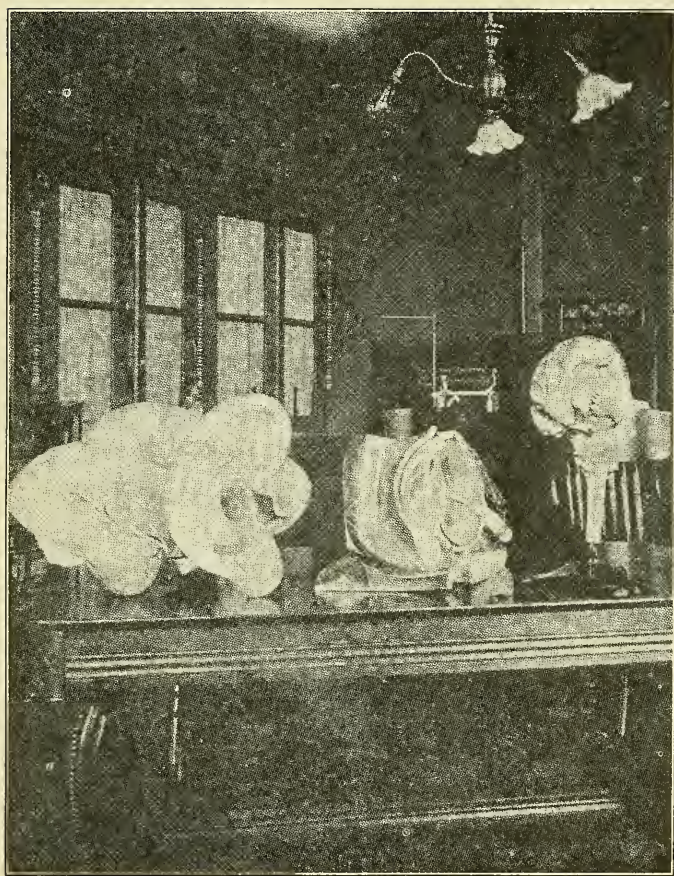
The mental examination is divided into two parts. The first an examination for the diagnosis, the second an intensive examination for the purpose of mental analysis.

The examination for diagnosis is made by means of the Binet-Simon Measuring Scale of the Intelligence. The Binet Scale is the most highly perfected system of tests for diagnostic purposes. It is the only series of tests of any description which has been so adapted to an established classification as to give absolute uniformity of diagnosis in the grading of feeble minded children. The sub-groups of the feeble minded, the idiot, the imbecile, and the moron, are, without it, ill-defined and depend largely on the personal equation of the examiner, with it they depend absolutely upon three great planes of language development; the idiots are limited almost entirely to gesture, the imbeciles to spoken language, while the morons are capable of learning to read and write. The series is moreover the only series in which mental ability and age are correlated, and it thus gives us not only a fair standard for the examination of the partially developed child mind, but also a means of determining the actual mental retardation of any child whose exact age is known. The age correlation given by the scale, the hierarchy of tests there presented, has been submitted to experimental trial by Binet and other investigators and the results confirm the norms given as true norms.

The scale consists of a number of groups of tests, each group assigned to a certain age at which average children are capable of passing it successfully. The child's intelligence level or mental age is determined by the highest group all the tests in which he passes. To allow for unevenness of development, an extra year of mental age is added for every five tests passed in groups superior to that group of which all tests are passed. No child is considered as belonging to the feeble minded group unless his mental age is at least three years in arrear of his real age. If his retardation amounts to this he is graded an idiot, an imbecile, or a moron, according to his mental age; idiot if this mental age is one or two, imbecile if it is three, four, five, six, or seven, and moron if it is eight, nine, ten, eleven or twelve. Higher than twelve years the feeble minded child seems not to develop. The system of notation used in recording the results of the tests is: + for success — for failure, ! for absurd responses. Partial credit is occasionally recorded by  $\frac{1}{2}$ .

No one should attempt to make these tests without a thorough study of the directions for so doing published by Binet and Simon in *L'Année Psychologique* 1908, and *La Bulletin de la Société libre pour l'Etude psychologique de l'Enfant*, April 1911. The authors are most emphatic in their statements that the Scale, in spite of its simplicity, is not a mechanical one, and the results obtained when it is used by untrained individuals are of no value for scientific purposes.

The second part of the mental examination consists of a series of tests designed to thoroughly explore the mental life of a developed individual. Tests are all standard ones selected from the literature in the course of clinical work with abnormal subjects. Many of them will be found inapplicable to low grade mentality as of course the more difficult of the Binet tests also are. The series of tests is divided into four sections in accordance with the recognition of three fundamental mental processes; sensation, reproductive memory, and apperception, and their final expression volitional motor ability. Of course none of these processes can be absolutely isolated in experiment, sensation will always merge into perception, and perception into apperception. The tests used, the material required, and the directions for testing, are presented in parallel columns to facilitate their use.



MODELS OF EAR, EYE AND BRAIN.





## History.

(Information to be obtained from parents, family physician, and others who know the family well.)

### General.

Child's full name and present address.

Name and address of parents or guardian.

Date of birth of child, or, if unknown, apparent age.

Birthplace of child, of father, of mother.

Occupation of father and mother.

### Heredity.

	1	2	3	4	5	6	7	8	9	10*	11	12	13
	Age if Living	Present Health...	Age at Death	Cause of Death....	Read and Write....	Criminal....	Ever Receive Public Relief..	Tuberculosis..	Hard Drinker..	Syphilis or Gonorrhea..	Insane, Epileptic or Feeble-Minded.....	Standing In Community..	Sexually Immoral.....
Father .....													
Mother .....													
Father's father.....													
Father's mother.....													
Mother's father.....													
Mother's mother .....													
Child's Brothers or sisters													
"													
"													

Notes:—

What other relatives of father or mother belong under 6, 8, or 11, giving details.

Which of the above or other blood relatives had any of the following conditions, specifying and giving details: Drug habit, vagrancy, special peculiarities of mind or body, hypochondria,

sexperversion, defect of sight, hearing, or speech (stating whether congenital or acquired), meningitis or brain fever (stating at what age) spasms or convulsions, chorea, hysteria, neurasthenia, paralysis, other nervous diseases or conditions, apoplexy, heart disease, sudden death, diphtheria, typhoid, scarlet fever, small pox, goiter, other severe disease or defect, serious operations, confinement in hospitals or institutions (what and why?), miscarriages (number and cause?), cancer, suicide.

Parents:            Father's parents:            Mother's parents:

Brothers:           Sisters:            Other near relatives:

### Growth and Retardation of Child.

Order of birth.	Weight at birth.	Born at full term?
Deficiency or peculiarity at birth.	What?	
At what age and how were peculiarities first manifested?		
At what age did the child recognize persons?		Sit alone.
Stand alone?	Walk alone?	Use spoon?
first teeth?		Get
Use first words?	First short sentences?	Acquire
tidy habits?		
Know most of his letters?	Get second teeth?	Start
to school?		
What progress at school?	Stopped at what age and grade?	
Why?		
Reads how?	Writes how?	Counts to?
Multiplies.	Divides.	Adds.
	Weight.	Height.

### Medical History.

What was the condition of the mother's health or habits during gestation?

Was she mentally troubled?            How and why?

Was labor long and difficult?            Instruments used?

Anesthetics?

Did child show deficient animation or vitality at birth?

Difficulty in breathing or nursing?

Any indications of specific disease?            What?

Malnutrition in infancy?            Rickets?

What troubles, if any in teething?

Has child had the following, stating age and severity:

Meningitis or brain fever?            Diphtheria?            Typhoid

fever?

Scarlet fever?                      Whooping cough?                      Measles?  
Chorea or St. Vitus dance?                      Tuberculosis?                      Scrofula?  
Sleep walking?                      Night terrors?                      Nervous attacks?

Describe.

Paralysis?                      Describe.                      What disease or trouble of eyes?

Of ears?                      Of nose and throat?                      Of skin?  
Has child had epilepsy?                      Fainting spells or spasms?  
State frequency of convulsions, if any, and date of last.  
What imperfections of speech?                      Of gait and movement?  
What troubles, mental or physical, at puberty?  
At the monthly periods?  
Has the child been pronounced insane or feeble-minded?  
When, and by whom?  
Name any other diseases or affections that child has had?  
Has been in what hospitals or other institutions, and why?  
Has undergone what operations?                      What severe accidents?  
When was the child last vaccinated?                      With what results?  
Has the child recently been exposed to infection?

State disease.

Give name and address of physician who attended at birth of child.

Name and address of present family physician.

### Environment and Personal History.

Has the family always been self-supporting?                      Cleanly?  
How was the child treated by and what was the influence of the father?

Of the mother?                      Of step-parent or others charged with its care?

Was the child indulged, maltreated, secluded?

How many persons in the home?                      How many rooms?

Was the home tranquil or disturbed?                      Moral condition of the home?

What was the influence of child's associates?

Of associates of the opposite sex?

What have been the child's chief interests?

In what ways has child been useful?

How does the child spend its leisure time?

Child's deportment and the impression made, at school?

At work?

How long has child worked? At what work and wages?

How does he care for money or valuables given or earned?

### **Capacities, Habits and Character.**

To what extent, if at all, has child used alcoholic drinks?  
Tobacco? Cocaine or other drugs?

What harmful personal habits does he have?

Does he run away from home? Ever hide or destroy things?

What is his attitude to animals? To playmates? To parents?

Is child's memory good? What evidence of it?

What does he learn rapidly other than school work?

Does he pay attention well? Obey well? Feed himself?

Dress and undress? Tie a shoe lace? Have morbid fears?

Queer ideas? Specify. Is child attentive to calls of nature?

Does he sleep well? How many hours?

Underscore words that describe child: Trustworthy, industrious, untruthful, lazy, seclusive, moody, cheerful, sly, selfish, slovenly, neat, ill-tempered, violent, excitable, thieving, sissy or cry-baby, emotional, affectionate, unfeeling, fighter, fits of temper, obstinate, anxious, fearful, complaining, gossipy, laugh or cry without cause, very changeable, proud (of what?), resentful.

What cause has been assigned for deficiency, if any is present?

Of what delinquencies has child been guilty? Give details?

What other exceptional behavior has been noted?

What punishments have been inflicted?

What is child's attitude toward correction?

What efforts have been made to help child, when, and by whom?

## Teachers' or Attendants' Record.

(The child should be under observation for at least a month before this blank is filled.)

Observation data concerning the habits, capacities, and mentality of..... Reported by ..... Date.....

### Habits and Characteristics.

Is the child very nervous? When, and how shown?

Is he noisy? Mischievous? How?

Does he run or stray away? Often? Get lost?

When?

Can he see well? Hear well? Read outside of school work? What?

Does he wet day clothing? Soil day clothing?

What unfortunate habits, sexual or otherwise?

Does he complain much? Of what?

In what way is the child most troublesome or faulty?

In what way does he most differ, if at all, from normal children?

Describe his habitual position in study or recitation.

Underline the words that correctly describe the child:

Cheerful. Morose. Quarrelsome. Active. Obstinate. Sensitive. Moody, Good-tempered. Excitable. Changeable in mood or character. Sly. Resentful. Lazy. Slovenly. Neat. Cleanly. Proud. Of what? Silent. Talkative. Obedient. Generally destructive. Heedless of danger. Destroys clothing. Destroys furniture. Cries without cause. Laughs without cause. Mouth usually open. Emotional. Lacking in feeling. Anxious. Impulsive. Lacks self-control. Easily managed. Superstitious. Apprehensive or fearful. Fears what? Cranky. Humorous. Very stupid. Selfish. Generous. Gossipy.

### Capacities and Incapacities.

Does he help care for other children?

Need careful and close supervision?

Can he talk?          Much?          Distinctly?          Can he do errands?

Does he know some letters?          How many objects can he count?

Can he add?          Multiply?          Divide?

Reads how, in          Reader?          Understands what he reads?

Writes fairly.          Spells fairly.          Copies dictation how?

badly.          badly.

well.          well.

Draws fairly.          Plays fairly, on what musical instrument?

badly.          badly.

well.          well.

Sing fairly.          What kind of songs or music?

badly.

well.

What and how well can child do in manual or industrial work?

In kindergarten?          In gymnastics?          In athletics generally?

In entertainment work?          Details.

What other studies or work is he engaged in, and what progress in each?

In what does he do his best work?          His poorest?

What is he "good at" in any direction?

Are there times when he does much better or worse than usual?

How account for these variations?          What prevents his doing better?

What noticeable defects has he?

### **Intelligence and Perception.**

Can he tie an ordinary knot?          Understand and obey commands?

Tell time?          Take care of apparatus and furniture?

How complicated are machines or tools which he can use?

How well adapt himself to changed schedule or other new conditions?

Does he think of what to do in emergencies, or in play? Examples.

What other evidences of intelligence or stupidity?

Ever imagine that he sees things?          That he hears voices or other sounds?

**Movements and Play.**

Can he throw and catch a ball?      Dance?      How well?  
 How does he walk?      Is he very awkward?      Very active?  
 Left-handed?      Use both hands equally well?      Quick or slow?  
 What automatic movements or mannerisms has he, and when?  
 How does he go up and down stairs?  
 Play much, or at all?      How?      How long at one thing?  
 What, for example?      Does he build blocks?      Collect things?  
 Excel or lead others in play?      Play over past experiences?  
 "Make believe" much in play?      Play alone or with others, usually?

**Learning, Interests, Imitation and Memory.**

Name the main interests noticed in this child, underlining the strongest.  
 Does he learn new work easily?      Remember it well?  
 Learn "pieces" easily?      Remember them well?  
 Talk or seem to think much of old-time experiences?  
 Of recent experiences?      Is he very forgetful?  
 What does he imitate?      How much and how well?  
 Mechanically or with understanding?  
 How much progress or decline have you seen in him, in how long?  
 Does he stick to tasks well?      Willing and tries?  
 Is he easily confused?      When and how?  
 Do you think he will improve, stand still, or go back?

**Morals.**

Is he cruel?      Profane?      Obscene?      Deceitful?  
 Thieving?  
 Untruthful?      Lacking in shame or modesty?  
 Ever violent to others?      Show sense of duty?  
 Of right and wrong, or remorse?  
 What evidences of interest in religion?      Is he trustworthy?  
 Of what immoral acts is the child frequently or sometimes guilty?

**Other Social Relations.**

Is the child easily led or persuaded? By whom?  
Over-dependent on others? Like to have and show  
authority?  
Is he confiding? Clummy? Timid?  
Bashful? Affectionate? Sociable? Sympathetic?  
What is his attitude toward his parents?  
Toward his brothers or sisters? Toward strangers?  
Toward animals or pets? Does he get on well with other  
children? Why not? Is he a sissy or cry-baby?



## Physical Examination.

### I.

#### General Anthropological Data.

1. Height. 2. Stretch of arms. 3. Weight. 4. Skull measurements (circumference at level of occipital protuberance and glabella, greatest lateral width). Rieger tracing if necessary. 5. Malformations.

(Underscore those found, in list below, and add any others.)

Head:—Microcephalic, macrocephalic, hydrocephalic, asymmetrical.

Face:—Prognathous, immobile, inferior maxillary small, large, superior maxillary small, nasal bones sunken, forehead retreating, narrow; face asymmetrical as to forehead, nose, eyes, ears, mouth.

Nose:—Much deflected, septum abnormal, base of nose broad, nostrils open forward.

Lips:—Hare-lip, lips very thick, very thin, fissured above, below, very long, very short.

Teeth:—Hutchinson's, persisting milk teeth, serrated, pointed or notched, chalky, impacted, irregular in shape or arrangement, decayed, rachitic.

Soft Palate:—Twisted R. L. Response of azygos muscle.

Hard Palate:—Cleft, V-shaped, semi-V-shaped, saddle-shape, high, narrow.

Eyes:—Pupil irregular or eccentric, congenial ptosis, epicanthus, oblique Mongolian, palpebral fissure small, asymmetry, in size, in color strabismus.

Ears:—Very large, very small, Darwinian tubercle, abnormal development, asymmetrical position or formation.

Tongue:—Very large, very small, thick, flat, pointed, fissured, enlarged papillæ.

Thyroid:—Enlarged, atrophied, absent.

Thorax:—Breasts absent, atrophied, small, large, supernumerary; development of breasts in male; pigeon breast, funnel breast.

**Upper Limbs:**—Very long, very short, asymmetrical: malformation of right, left hand; fingers united, supernumerary, two-jointed, very long, very short. Little fingers imperfect. Left handed, ambidextrous.

**Lower Limbs:**—Club foot; toes united, supernumerary: knock-knee, bow-legs, legs or feet very long, very short, asymmetrical.

**Genitals:**—Incomplete descent of one or both testicles. Organs over-developed, undeveloped; atrophied. Hermaphrodism, true or false. Phimosis. Stenosis or reduplication of vaginal and uterine canals. Undeveloped uterus, ovaries, vagina. Clitoris enlarged or hooded.

**Skin:**—Pallid, sallow, leathery, prematurely wrinkled, birth-marks.

**Hair:**—Coarse, scanty on face, eye brows, chest, pubes. Hairy moles or tufts on body. Gray hair in patches. Bald spots. Eye brows meet. Abnormal distribution of hair.

**Nails:**—Thin and friable, pigmented, arched and thickened, long, short, furrowed lengthwise, crosswise.

**Bodily characteristics:**—Gigantism, dwarfism. General balance relaxed. Asymmetrical posture or headbalance. Scoliosis, Lordosis. Feminine aspect. Mincing or shuffling gait.

## II.

### **General Appearance as Regards Past and Present Health.**

General state of nutrition. Color of mucous membranes. Presence of jaundice, œdema, etc. Presence of skin eruptions (describe in detail and chart). Evidences of syphilis recent or remote, (gummata, scars on genitalia, tibial crests, and tongue). Evidences of old rickets. Signs of gout or rheumatism. Enlargement of thyroid. Scars and bruises. Bodily temperature. Apparent age.

## III.

### **Spontaneous Complaints.**

Feeling sick, weakness, nervousness, vertigo, headache, pain, etc. These should all be carefully investigated and recorded in the patient's own words, or if he does not speak, with his description.

## IV.

**Respiratory System.****A. Upper Respiratory Tract.**

Character of naso-pharyngeal mucous membrane, presence of obstructions such as polypi, adenoid growths, or enlarged tonsils. Abnormalities of pharynx or larynx.

**B. Lower Respiratory Tract.**

Rapidity and character of breathing (easy or difficult, nasal or oral, abdominal or thoracic). Dyspnoea. Any pain on breathing, cough or expectorations (character and amount). Shape and degree of expansion of chest. Inspection, palpation, percussion, and auscultation (make both anterior and posterior examination of chest including apical region).

## V.

**Circulatory System.**

Sensation of palpitation, arrhythmia, pain or anxiety, with full details. Position and character of cardiac impulse. Occurrence of abnormal pulsation in chest wall. Area of cardiac dullness. Character of sounds at apex and base. Pulse: Rate, quality, variations in both as the result of change posture (lying, sitting, standing), emotion and exertion. Sphygmogram. Sphygmomanometric reading. Condition of the walls of the arteries (radial, brachial, temporal, femoral, dorsalis pedis, and in ocular fundus on both sides) Abnormalities of veins—varicoseities, pulsations, etc. Examination of blood.

## VI.

**Digestive System and Abdomen.**

Appetite, thirst, nausea, vomiting, eructation, pain, etc. Condition of mouth, teeth and tongue. Size and position of stomach. Analysis of stomach contents where indicated. Outline of liver, spleen, palpation of kidneys, (movable or not movable). Character and frequency of stools with microscopic examination if indicated. Areas of tenderness over abdomen (McBurney's point, etc.)

## VII.

**Urinary Apparatus.**

Pains or subjective symptoms referred to kidneys or bladder. Frequency of micturition. Amount of urine in 24 hours. Chemical and microscopic examination of urine. Inflammation of mucosa, bladder and urethra.

## VIII.

**Genital Organs.**

The menstrual functions, their regularity as to frequency and amount; any accompanying symptoms (pains, irritability, nervousness, etc.) Examination of the pelvis per vaginam or per rectum as indicated. Quantity and character of any discharge.

Frequency and character of functional activity. Examination of prostrate if indicated. Presence of scars or discharge.

## XI.

**Nervous System.**

\* \* \*

**A. Centripetal Apparatus.****1. Special Senses.**

Smell. Examination of nerves. Test each nostril separately with peppermint, oil of cloves, and asafetida. Note the actual answers.

Vision. Examine cornea (for opacities and signs of interstitial keratitis), lens, humors, and ocular fundus (describe and chart any abnormalities). Acuity of vision (any areas of refraction to be corrected). Fields of vision (examine with finger roughly and if necessary with perimeter for scotomata, hemianopia, etc.).

Taste. Condition of tongue should be noticed. Test separately the interior two-thirds and posterior third on both sides with salt, sugar, quinine and vinegar. (Do not allow the patient to roll the tongue in the mouth and let him answer by pointing to card on which is written salt, sweet, bitter, sour).

Hearing. Examine the meatus, canal, and membrane. Note the presence of any cerumen or discharge. Test each ear with the watch and tuning fork both for air and bone conduction. Galton's whistle.

## 2. Cutaneous Sensibility.

Both touch and pain sense should be examined roughly in every case and a more exhaustive examination with charts made wherever any changes are noted. Always test the ulnar borders of the fore-arm, the outer sides of the thighs just above the knees, and the dorsum and soles of the feet. Remember sensibility to pain and temperature may be diminished or lost when the tactual sense is unaffected in tabes, general paralysis, etc., as well as in syringomelia.

1. Subject symptoms.—Pain, (character and distribution), numbness, formication, pins and needles, coldness, and heat.

2. Tactile sensibility.—Examine with tip of finger or by drawing thread over the skin. Note the acuteness of sensibility and the accuracy of localization for space and time. In recording on a chart, tactile anaesthesia is marked by horizontal lines and its degree indicated by the length of the lines.

3. Pain.—Test with a pin point, which should be guarded by the tip of the examiner's finger to prevent discrimination as point by the smallness of the area touched. Ask whether the stimulus is actually painful, and note accuracy of localization in time and space. Be sure that patient is attending. Mark on chart with vertical lines.

4. Temperature.—Test with warm and cool water in test-tubes. For charting use diagonal lines.

5. Stereognostic sensibility.—This is not strictly a pure cutaneous sensibility, but may for convenience be considered here. It consists in the power to recognize objects by palpation with the eyes closed.

## 3. Deep Sensibility.

1. Tenderness of nerve trunks to pressure. (Ulnar at elbow and musculo-cutaneous of leg below head of fibula.)

2. Tenderness of muscles on pressure.

3. Sense of position. Test by asking patient to describe the position of a limb after it has been passively moved or by asking him to imitate the position with the limb on the other side.

4. Sense of passive movement.

5. Sense of tension as estimated by judging weights.

6. Coördination of muscles. Finger-nose test, Rhomberg test, walking along line, putting heel on opposite knee, etc.

7. Pallaesthesia.—Sensibility to vibration of tuning fork.

## B. Centrifugal Apparatus.

...

### Cranial.

1. Ocular Group Pupils:—Size, shape, position, (central or eccentric). Note any evidence of old iritis. Rapidity and degree of contraction to light (notice whether they dilate again at once and oscillate), dilatation to shade. Contraction in accommodation, convergence, and after tightly closing the lids. Dilation from painful stimulus, e. g., over cheek bone. Where there is any suggestion of affection of the sympathetic test dilatation with cocaine.

Extrinsic muscles: —Are the optic axes parallel? Examine movements of the eyes in all directions and note whether the movement is full and steady (jerky, nystagmoid, nystagmus. In this last describe the direction of the movement and the position of eyes in which it occurs.) If there is any complaint of diplopia examine with flame and colored glass.

Upper lids:—Width and equality of palpebral fissures the direction of the wrinkles on the forehead (may be altered as result of weakness of the levator palpebrae.) Ptosis, subptosis. Lagophthalmos, von Graefe's and Stellwag's signs.

2. Masticatory Group:—Any deviation of the jaw in opening the mouth, power to hold jaw open, power in closing (compare the degree of hardening of the masseters and temporals in clenching the teeth).

3. Facial Group. Upper Part—Scowling, frowning, and raising the eyebrows, closing the eyes tightly.

Lower Part—Showing the teeth and tongue, whistling. Compare the two naso-labial folds. Observe the facial movements also in emotional and associated movements (clenching fists, etc.)

4. Phonation-Articulation-Deglutition. Character of voice smooth or harsh, nasal. (For this last good test words are amber, under, kick, cook). If there is any change examine the larynx. Movements of the palate in phonation (compare the arch on each side of the uvula.) Hardening of the muscles of the floor of the mouth when the tongue is pushed against the closed teeth. Position of the tongue as it lies in the mouth when this is slowly opened. Protrusion of tongue (use line between median



incisor teeth as guide for midline), freedom of movement when out, power of thrust into either cheek. Look for signs of early atrophy of the tongue along the lateral margins. Describe any defects in articulation, using as test words electricity, truly rural, royal Irish constabulary, Methodist Episcopal, particular popularity. If there is any difficulty in swallowing, note whether due to defect in palate (nasal voice and regurgitation of fluids), in passing the bolus back to the pharynx, or below the pharynx. If indicated use oesophageal sounds. (Exclude thoracic aneurism first.)

### Spinal.

1. General muscular development in relation to occupation, tonus of muscles, power in comparison with development. Always compare on the two sides the grip (use dynamometer), flexion and extension at the wrist, elbow, knee, and ankle. Describe the general character of the movements as to ease or clumsiness, extent (if restricted examine the joints), and take special note of gait (when not conscious of direct examination), taking off and putting on clothes, and writing. Samples of the last should be inserted in every case—name, date, and test phrase. Where any weakness or atrophy is observed, it is necessary to examine in detail the muscles moving each point, and often to examine the excitability of the muscles to mechanical stimulation and to the electric current—Faradic and Galvanic.

2. Abnormal Contractions. a.—Fibrillary twitching, its distribution and persistence, and conditions modifying its occurrence. b.—Tremors. Location, character, rapidity, amplitude, and direction. How modified by rest, exercise, sleep, and effort of will. c. Irregular movements, such as chorea.

d. Spasm, such as facial spasm, hysterical spasm. e. Psychogenic—tic, catalepsy, negativism, etc.

3. Examination of cerebral spinal fluid.

### C. Reflexes.

#### 1. Superficial.

*Corneal.* Blow on cornea.

*Palatal,*

*Sneezing.*

*Scapular, Gluteal.*

*Epigastric, Abdominal, Cremasteric.*

*Plantar.* Stimulate with the finger or handle of percussion hammer, drawing it from heel toward the toes. Be careful to have the knee bent and the ankle loose, and do not press hard on the sole. Describe the movements which occur, especially in the big toe, and where no response is obtained in the toes, notice for any contraction in the Tensor Fasciae Femoris. Note whether response is more readily obtained from the inner or outer side of the sole of the foot.

#### 2. Deep.

*Masseteric.* Tap on the chin with the mouth slightly open.

*Scapulo-humeral.* Tap on the edge of the scapula just above the ridge while the arm hangs loosely by the side.

*Biceps.* Percuss the thumb placed on the tendon.

*Supinator longus.* Tap the lower end of the radius.

*Triceps.* Tap the tendon.

*Knee jerk.* Examine with feet resting on the floor, but pushed forward as far as possible. Compare the two sides and note the ease with which obtained, whether elicited with every tap, the effects of reinforcement. Depressed patellar jerk when lying down. Note the occurrence of patellar clonus, and spread to other muscles.

*Adductor jerk* by tapping the inner side of the knee.

*Ankle jerk.* Examine where possible with the patient kneeling with feet hanging over the edge of the support and tap the tendon, varying the tension of the muscles by bending the ankle more or less. (This reflex is often lost earlier than the knee jerk.) In examining for ankle clonus, have the patient lying down, and test with the knee flexed at various angles.

*Gordon's paradoxical reflex.* Pressure on the calf (flexor) muscles gives rise to extension of the big toe. This is probably present in slighter degrees in pyramidal tract affection than the Babinski phenomenon.



### 3. Organic.

*Bladder.* Delay; retention; incontinence with full or empty bladder; dribbling after micturition; residual urine. Consciousness of passage of urine. Peculiar sensations.

*Rectum.* Spasm or relaxation of sphincter (insert finger), involuntary evacuations, consciously or not.

*Sexual.* Any abnormalities.

### Examination of Convulsions.

Is there any aura? Describe carefully in patient's own words. Is it always present? Does it sometimes occur without a convulsion? Is consciousness lost? How soon? And for how long? Is there a cry? fall? Where does the convulsion begin? Always in the same place? What is the direction of its march? Is it confined to a single part? to one side of the body? general? Is a paralyzed part involved or omitted? Is there a clonic as well as a tonic stage? Attitude of the body at the height of the convulsion? What is the average duration? Frequency and hour of occurrence? Is the tongue bitten? Involuntary micturition or defaecation? Where possible, study carefully the condition of respiration and circulation, the pupils and reflexes during and after the convulsions. Is it followed by deep sleep? headache? transient or permanent weakness or paralysis of any part of the body? any automatic movements? Investigate for any history of petit mal (momentary sensations, flashes of light, vertigo, loss of self, involuntary micturition, etc.) for any evidence of automatism, sudden inexplicable outbursts of anger, etc. Any conditions which seem to have any bearing in the excitation of the convulsions.

## Record to be Made at Post-Mortem Examination.

Name.....Case No.....Date. ....  
 Age.....Sex.....Color.....Address.....Married....  
 Single .....Admitted.....Died .....Autopsy.....Hrs.  
 after death, weather cold, mild, hot.  
 History alcohol..... syphilis .....Tbc .....Injury ..... Clinical  
 diag ..... Autopsy ordered by..... Performed by  
 .....Cause of death.....

### 1. *External Appearances*

Nutrition.....Weight.....Lbs., Length.....  
 Appearance of skin....., Eruptions..... Scars.....  
 Wounds.....Bruises.....  
 Deformities. .... P. M. Lividity ....

### 2. *Head*

Scalp..... Hair ..... Eyes, Sunken..... Protruding.....  
 Pupils.....  
 Skull depressions..... Size..... Thickness .....  
 .....Injuries.....  
 Fluid in Cranium.....Character.....  
 ..... Dura Mater, thickness ..... Color.....

Adherent to .....

Sinuses, quality of blood .....

Thrombi .....

Pia Mater, thickness .....

Vascularity ..... Fluid .....

Vessels at base .....

Cortex .....

Convolutions .....

Brain, weight.. ..... Consistency..... Color.....

Ventricles lateral size. .... Contents .....

Choroid Plexus..... Softening .....

Blood Clots ..... Tumors .....

### 3. *Spine,*

Deformities ..... Cord .....

4. *Thorax and Neck.*

Glands Neck..... Axillae ..... Mammae.....  
 Tongue.....Salivary glands.....Tonsils.....  
 Trachea .... Larynx ..... Mediastinal gland.....  
 Lungs left upper Lobe .....  
 Lungs left lower Lobe.....  
 Lungs right upper Lobe .....  
 Lungs right middle Lobe .....  
 Lungs right lower Lobe.....  
 Bronchi.....Diaphragm right side.....Left side.....  
 Pleurae left adhesions .....  
     Effusion.....  
 Right adhesions.....  
     Effusion.....

5. *Heart*

Size.....Position.....  
 Pericardium adhesions.....Effusion Quan....Char.  
     .....Thickness.....Surface .....  
 Heart opened in situ blood.....Clotted.....  
 Clots right.....Chicken fat. ., Red..... White.....  
 Clots left.....Chicken fat.....Red..... White.....  
 Weight.....Ounces  
 Hypertrophy.....R.V.....R.A. ....L.V.....L.A.....  
 Dilatation.....R.V.....R.A.....L.V. ....L.A.....  
 Cardiac Muscle Firm.....Friable. ....Fatty.....Color.....  
 Valves Mitral.....Aortic.....Tricuspid.....Pul.....  
 Coronary Arteries.....Sclerosed.....Thrombosis.....  
 Pulmonary Artery.....  
 Aorta Arch.....Thoracic.....Abdominal.....Others.....

5. *Genito Urinary Tract.*

Kidney Lft. wt.....Oz. Color.....Shape .....Size.....  
 Capsule.... Venae Stellae.....Infarcts.....  
 Cortex.....Relation to Medulla. ....Cysts.....  
 Pelvis.....Distended.....Fluid.....Pus.....Stone.....  
 Large White Kidney.....Passive Congest. Kidney.....  
 Amount of perinephritic Fat...Movable 1de...2de...3de...  
 Chronic contracted Kidney.....  
 Right wt. ....Oz.,Color.....Shape.....Size.....  
 Capsule.. Venae Stellae.....Infarcts.....  
 Cortex.....Relation to Medulla.....Cysts.....  
 Pelvis.....Distended.....Fluid.....Pus.....Stone.....  
 Lesion Pas. Cong.....LargeW.....Ch. Cont.....  
 Amount of perinephritic fat...Movability 1de..2de..3de...  
 Supra Renal Bodies Lft.....Rt.....

Bladder contents.....Oz.....Thickness.....M. M.....  
 Ureters Lft.....Rt.....  
 Prostate Size.....Cent. Lobe .....Rt. ....Lt.....  
 Urethra M.M. ....Stricture.....Malfor.....  
 Testicles Lft.....Rt.....  
 Seminal Vesicles Lft..... Rt.....  
 Uterus Size.....Tumor.....M.M.....  
 Tubes Lft.....Rt.....  
 Ovaries Lft.....Rt.....

#### 6. *Abdomen.*

Position of organs.....  
 Peritoneum.....Adhesions.....  
 Fluid in cavity.....Amt.....Character.....  
 Liver Weight.....Color.....Size.....Surface.....  
 Edges ..... Cut Surface.....  
 Consistence.....  
 Gall Bladder..... Stones.....  
 Gall Ducts.....Bile.....  
 Lesion.....  
 Pancreas.....  
 Spleen Wt.....Capsule..... Cut Surface .....  
 Peritoneal Lymph Glands.....  
 Stomach size..... Contents.....  
 Mucous M.....  
 Thickness.....Ulcers .....Scars.....  
 Pylorus thickness.....Esophagus.....  
 Congestion.....Lesion.....  
 Small Intes. Appendix contents.....  
 Ulceration.....Contents.....  
 Obstruction.....Intuss.....Volvulus.....  
 Parasites.....Hernia.....  
 Large Intest dysentery.....Contents.....  
 Construction.....  
 Location.....  
 Hemorrhoids .....  
 Other organs.....

Spec. Preserved in Museum No.....

## Mental Examination.

### I.

## Examination for Mental Diagnosis.

### BINET-SIMON MEASURING SCALE OF THE INTELLIGENCE. 1911 REVISION.

#### Idiots.

#### Mental Age 1 and 2 Years.

1. Move lighted match slowly before child's eyes. *Full credit given if eyes follow light for briefest period.*
2. Place a wooden block in child's hand. *Credit given if block is grasped.*
3. Show the wooden block without touching child with it and say, "This is for you, don't you want it to play with?" *Credit given if child takes it.*
4. Offer child a piece of wood and a piece of chocolate of the same size. *Credit given if he eats the chocolate and does not attempt to eat the wood.*
5. Show child a piece of chocolate, then wrap it in paper and present it to him, telling him to eat it. *Credit given if he removes the paper before eating.*
6. Make simple movements, clapping the hands, sitting down, standing up, etc., and tell child to do the same. *Credit given if one imitation is accomplished.*

#### Imbeciles.

#### Mental Age 3 Years.

7. Show me your nose. Show me your eyes. Show me your mouth.
8. Listen well and repeat what I say. 4; 3—7; 6—4; 5—8; Pronounce numbers slowly and distinctly with one-half second interval between, one pair at a time. *Full credit given for one exact repetition.*
9. Place Picture 1 before child and ask, "What is that?" or "What do you see there?" Follow this by Pictures 2 and 3. (Figures 1, 2, 3.) *Full credit given if some objects are enumerated.*

10. "What is your name?" If first name only is given—"and your other name?"

*Surname required.*

11. "Listen well and repeat what I say. I am cold and hungry." *No errors of any kind allowed.*

### Mental Age 4 Years.

12. "Are you a little boy or a little girl?" If necessary—"Are you a little girl?" "Are you a little boy?"

13. Show child a pen knife saying; "What is that? What is it called?" Then show penny and finally key, asking same questions. *Name of three objects required.*

14. "Listen well and repeat what I say. 4—9—2; 3—7—4; 5—8—1." *Full credit given for one exact repetition.*

15. "You see these two lines. Tell me which is the longer." (Figure A.)

### Mental Age 5 Years.

16. Place two boxes weighing 3 and 12 grams respectively on the table before the child leaving a space of 5 or 6 centimeters between them and say, "You see these two boxes? Tell me which is the heavier." Repeat, using boxes weighing 6 and 15 grams and repeat again using first pair.

*If there is still doubt about the child's ability to compare weights, repeat process.*

17. Draw a square 3 to 4 centimeters in diameter with ink and ask the child to copy it, giving him pen and ink to do so.

18. "Listen well and repeat what I say. My name is Charley. O! the naughty dog."

19. Place four pennies in a row before the child and say, "Do you see these pennies? Count them and tell me how many there are."

*Child is required to point to each with finger, no error allowed.*

20. Place an oblong card on the table before the child and place also, nearer to the child 2 triangular cards formed by cutting another card like the first one in two, along a diagonal. Place these two triangular cards in such position that their hypotheni form a right angle one with the other, then say to the child, "Put these two pieces together so that they will form one card like this," (indicating the oblong card.) If the child turns over one triangular piece without noticing it it is permissible to begin again.



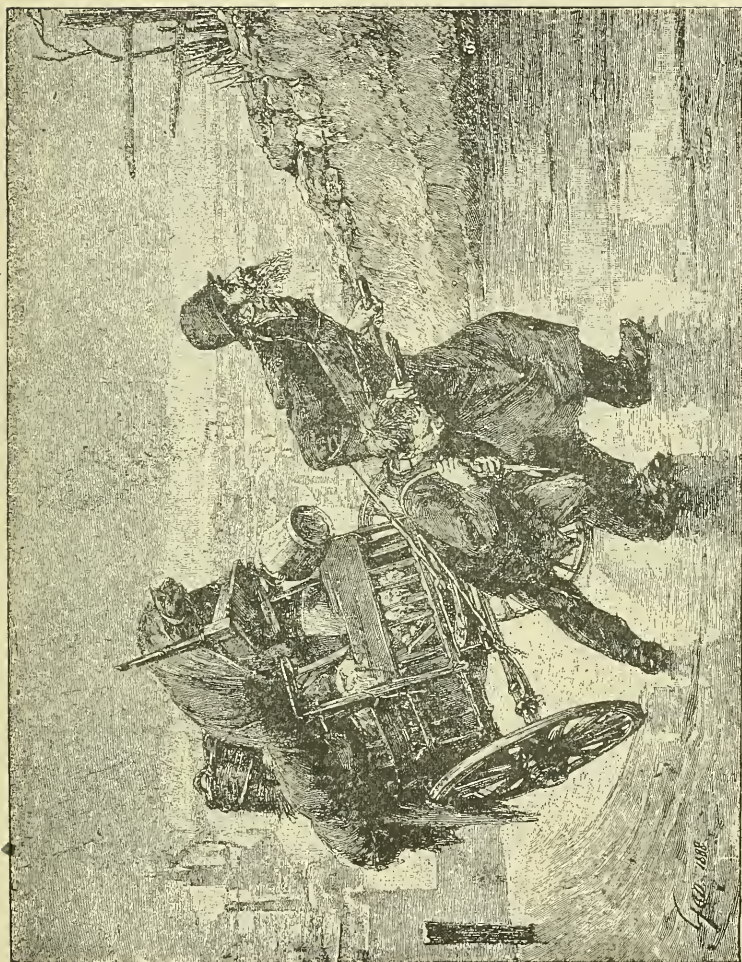
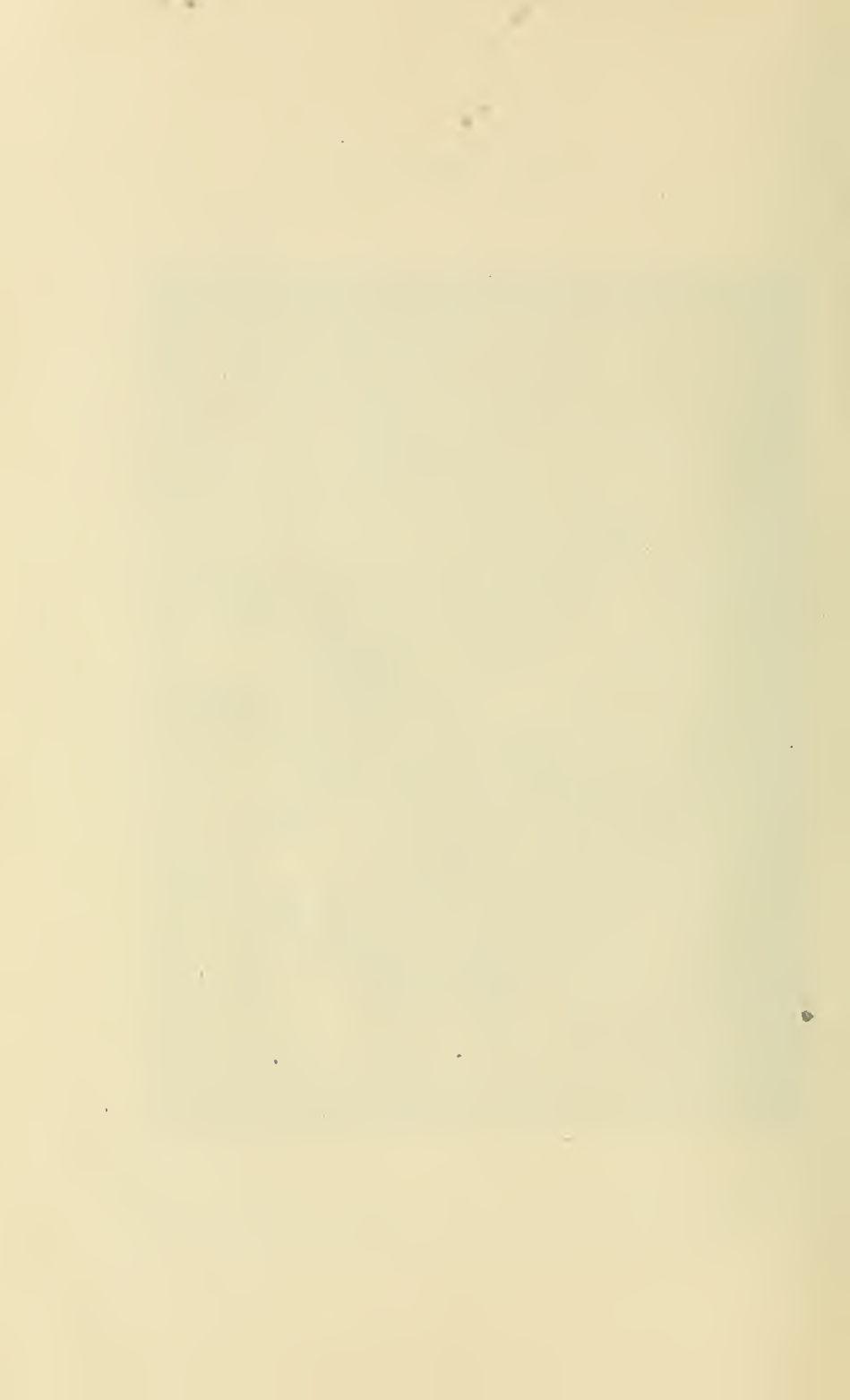


FIGURE 1.





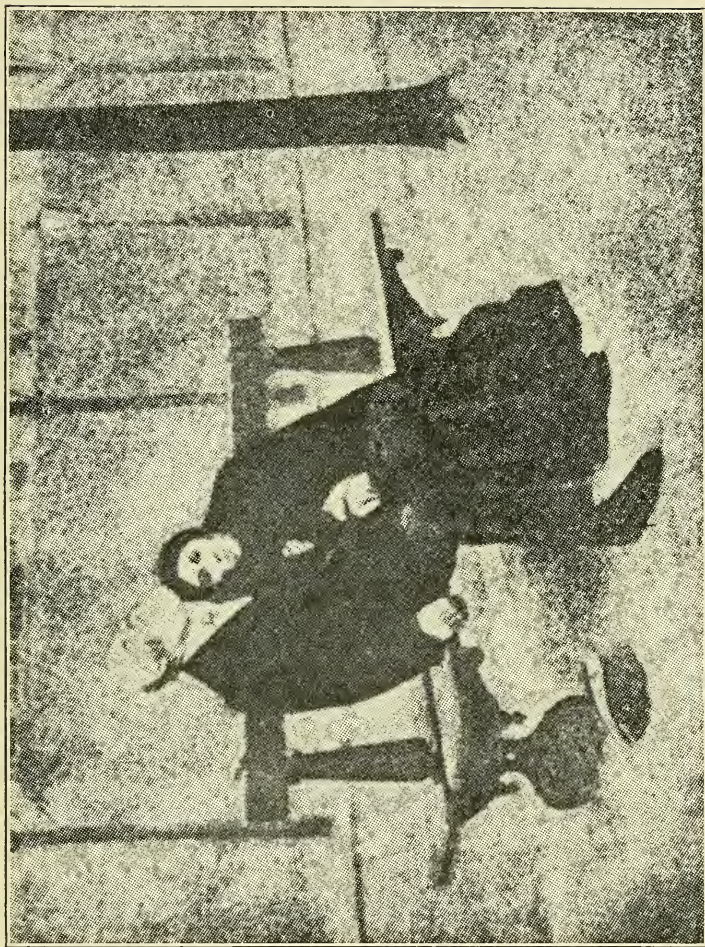


FIGURE 2.



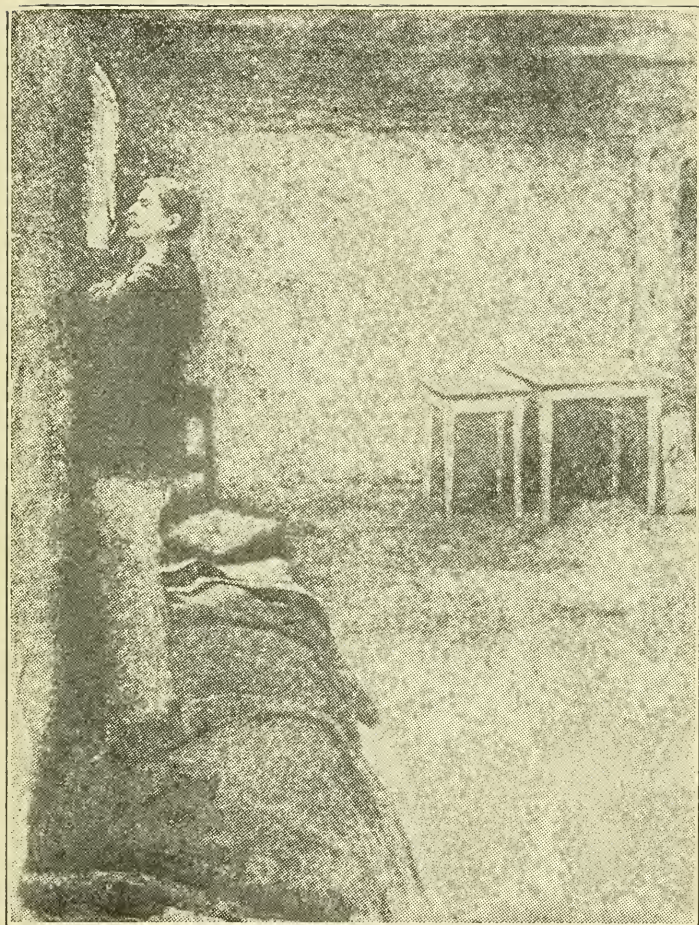


FIGURE 3.





\_\_\_\_\_

\_\_\_\_\_

FIGURE A.





2



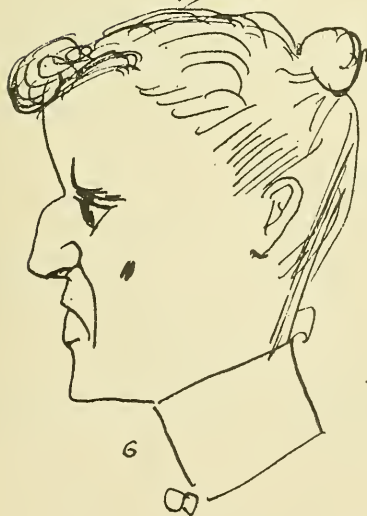
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3



4



6



5

FIGURE 4.





**Mental Age 6 Years.**

21. "Is it morning now?" "Is it afternoon now?"

22. "What is a fork?" "What is a table?" "What is a chair?"  
"What is a horse?" "What is a mama?"

*If some use of three of the objects is mentioned the reponse is considered correct.*

23. Draw a diamond figure with ink and ask the child to copy it, giving him pen and ink for the purpose.

24. Place 13 pennies in a row on the table before the child and say, "Count these pennies for me, pointing to each one as you count it."

25. Show pictures of faces (Figure 4). Expose first the upper two alone, next the two middle ones, and last the two lower ones, saying each time, "Which is the prettier of these two faces?"  
*No error allowed.*

**Mental Age 7 Years.**

26. "Show me your right hand." "Show me your left ear."  
*No error allowed.*

27. Show picture as in Test 9, requiring descriptions.

28. "Take this key and put it on that chair, bring me that book lying on the table, and open the door." *Repeat these directions distinctly twice.*

29. Place three two cent and three one cent stamps on the table before the child. Make sure that he knows the 2's from the 1's and ask him to count how much they would all cost.

30. Have four pieces of colored paper, red, blue, yellow, and green. Point to each asking "What is this color?" *No error allowed.*

**Mental Age 8 Years.**

31. (a) "Do you know what paper is?" "Do you know what cardboard is?" "Are they alike?" "In what way are they not alike?"

(b) "Have you ever seen a fly?" "Have you ever seen a butterfly?" "Are they alike?" "In what way are they not alike?"

(c) "Do you know wood when you see it?" "Do you know glass when you see it?" "Are they alike?" "In what way are they not alike?" *Two satisfactory answers required.*

32. "I want you to count backward from 20 to 0. Like this—20—19—18." *This must be accomplished in 20 seconds. One error allowed.*

33. The four pictures in figure 5 are shown one at a time and the question asked with each, "What is missing in this picture?" *Three correct replies required.*

34. "What day is today? What date is it?"

35. "Listen well and repeat what I say: 3-8-5-7-1; 9-2-7-3-6; and 5-1-8-3-9." *One group given at a time. One exact response required.*

### **Mental Age 9 Years.**

36. In a pile before the child place the following coins;—ten pennies, two nickels, two dimes, one quarter, one half dollar. Then propose a game of storekeeping, the child to keep the store and use the pile of money to make change, the experimenter to be the customer. Add some articles for sale. Then buy something for four cents. Give the child a quarter and require the change.

37. Test No. 22. Definitions superior to use are required.

38. Show the child successively a penny, a dime, a dollar, a quarter, a nickel, a half dollar, a two dollar bill, a ten dollar bill, a five dollar bill. Ask, "What is this?" with each.

39. Name the months of the year in order. *One error allowed. time 15 seconds.*

40. (a) "If you were going away and missed your train, what would you do?"

(b) "If one of the boys should hit you without meaning to, what would you do about it?"

(c) "If you broke something belonging to some one) else, what would you do about it?" *Two good responses required.*

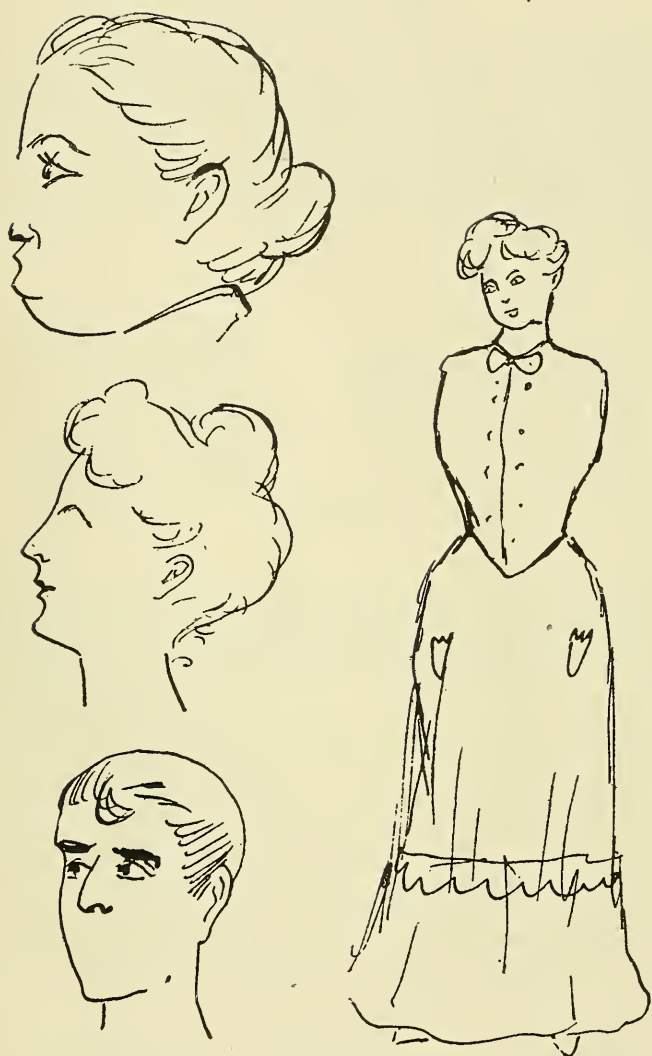


FIGURE 5.



**Mental Age 10 Years.**

41. Place on the table before the child five boxes weighing 3, 6, 9, 12 and 15 grams respectively. Say to him "These little boxes all weigh different amounts. Some are heavier and some lighter. I want you to place the heaviest here and by its side the one which is a little less heavy, and then the one a little less heavy and the one still a little less heavy, and finally here the lightest." *Three trials made, the boxes mixed after each. Two successes in three are required.*

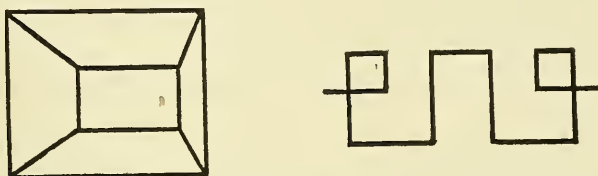


FIGURE 6.

42. "I am going to show you two drawings and after you have looked at them I shall take them away and ask you to draw them from memory. You must look at them closely because you will only have them for ten seconds and this is a very short time." (Drawings shown in figure 6.)

*Full credit is given if the whole of one drawing and half of the other is reproduced exactly.*

43. "I am going to read you some sentences; in each one of them there is something foolish or absurd. You listen carefully and tell me each time what it is that is foolish."

(a) "An unlucky bicycle rider fell on his head and was instantly killed; they took him to the hospital and fear that he cannot get well."—After a pause—"What is foolish in that?"

(b) "I have three brothers, Paul, Ernest, and myself"—"What is foolish in that?"

(c) "The body of a young girl cut into 18 pieces was found yesterday. People think that she killed herself".—"What is foolish in that?"

(d) "There was a railroad accident yesterday, but not a serious one, only 48 persons were killed"—"What is foolish in that?"

(e) "A man said;—"If I should ever grow desperate and kill myself I should not use Friday for the purpose because Friday is an unlucky day and might bring me unhappiness"—"What is foolish in that?"

*Correct solution of three of the five statements required.*

44. (a) "If you were delayed on your way to school, what would you do about it?"

(b) "Before taking part in something very important, what would you do?"

(c) "Why do we more easily pardon a bad act done in anger than a bad act done without anger?"

(d) "If some one should ask your opinion of one whom you did not know very well, what would you say?"

(e) "Why should we judge a person by his acts rather than by his words?"

*Two errors allowed.*

45. Write the words, *Paris, fortunes, stream*. Show them to the child reading them to him several times. Then give him pen and ink and tell him to write a sentence containing all three of these words.

*Full credit is given for two sentences containing the three words.*

### Mental Age 12 Years

46. "Which is the longer of these two lines?" Fig. 7.

"Which is the longer of these two lines?" Fig. 8.

"Which is the longer of these two lines?" Fig. 9.

"And of these?" Fig. 10.

"And of these?" Fig. 11.

"And of these?" Fig. 12.

*Full credit given if suggestion of longer line to the right does not hold in last three pair. One-half credit if it only partially holds.*

47. Test 45. *Credit given for one sentence containing the 3 words.*

48. "I want you to say just as many words as you can in three minutes. Some boys say as many as two hundred. Now you must try and see how many you can think of."

*Sixty words the minimum accepted.*

49. "What does charity mean?" "What does justice mean?" "What does kindness mean?" *Two correct answers required.*

50. "Find the sentences which these words make. Fix the words in their proper order."



FIGURE 7.





FIGURE 8.

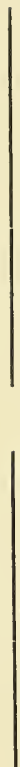




FIGURE 9.





FIGURE 10.

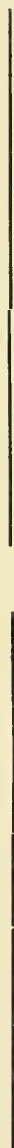






FIGURE 41.

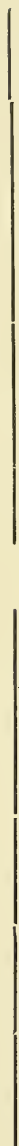
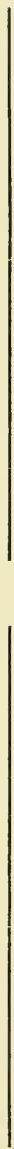




FIGURE 12.





- (a) At-country-we-for-started-hour-an-the-early.
- (b) Teacher-I-to-my-exercise-asked-my-correct.
- (c) Defends-a-his-dog-master-good-bravely.

### Mental Age 15 Years.

51. "I am going to say seven numbers. Listen well and repeat them exactly. 4-9-2-6-5-3-7; 9-3-5-1-8-2-6; 2-7-4-9-3-8-5." *One success in three required.*

52. "Do you know what the word rhyme means? Two words that rhyme are two words which end in the same sound. Thus *Singing* rhymes with *Ring*ing. Sing-ing, Ring-ing. They both end in ing. The same way Sailor rhymes with Tailor. Sail-or and Tail-or. They both end in or. Do you understand? Now I am going to give you a word and you try to find the words which rhyme with it. The word is *obey*. Find all the words that rhyme with obey."

*Three words required in one minute.*

53. "Listen carefully and repeat exactly what I say, The other day I saw on the street, a pretty yellow dog. Little Morris has soiled his nice new apron."

54. Test No. 9 and 27. Interpretation required.

55. (a) "A woman was walking through a park in Chicago. Suddenly she stopped dreadfully frightened. She ran to the nearest policeman and told him she had seen hanging to the limb of a tree a"—after a pause,—“A what?”

(b) "My neighbor has just received some singular visits; one after another, a doctor, a lawyer, and a priest called. What is happening at my neighbor's?"

*Full credit given only if both problems are answered satisfactorily.*

### Adult.

56. "Here is a paper folded in four, suppose that here (pointing to a small triangle which has been drawn in the middle of that edge which consists of but a single fold), I cut out this little triangle of paper. Now if I unfolded the paper how would it look? Draw the paper as it would appear if unfolded and show how and where it would be cut." (Figure 13.)

*Requirement: Two diamonds drawn in line with each other and each in the center of one half of a square.*

57. An oblong card cut in two along a diagonal is placed in

position before the subject. "Look well at the lower piece of card. Suppose that I lift it and place this edge (tracing the edge a-c with the finger) on this edge (a-d of the upper piece.) Suppose further that this point (c) is placed just on this point, (b).. Now I take away the piece, in your imagination, place it as I have described and draw its outline in this position. Commence by following the outline of the first piece." (Figure 14.)

*It is required that a right angle be represented at (b) and that the edge a-c be shorter than the edge a-b.*

58. "What is the difference between laziness and idleness?" "What is the difference between event and advent?" "What is the difference between evolution and revolution?" Two correct responses required.

59. "There are three principal differences between a King and a President of a Republic. What are they?"

Required answer: Royalty is hereditary, the tenure of office is for life and it's powers are very great; the president is elected, his tenure of office is limited and his powers are less extensive.

60. "Listen attentively to what I am about to read. After finishing I shall ask you to repeat the sense of the selection: *Many different opinions are given of the value of life, some deem it good, others bad. It would be more just to say that it is mediocre; because on the one hand our happiness is less than we would have it and on the other hand our unhappiness is less than others wish for us. It is this mediocrity of life which makes it just or rather which prevents it from being radically unjust.*"

It is required that the thought of this selection be understood.



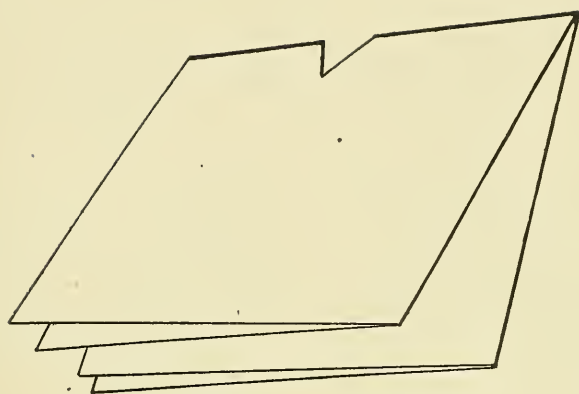


FIGURE 34.

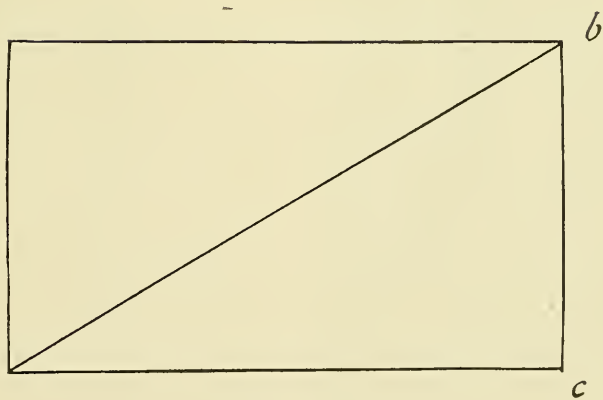


FIGURE 14.



## II.

## Tests For Mental Analysis.

\*\*\*

## Part I. Sensation and Perception.

TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING.
1. VISUAL  a. Acuity.	E Test card (F. A. Hardy, Chicago.) Trial frame for lenses. One-.75 D. & one + .75 D. lens. One blank disc.	Place subject 6 meters in front of test card, which should be hung on a well illuminated wall and on a level with the S's eyes. Tell subject that whenever you point to an E he is to show in which direc- tion the prongs point by point- ing in the same direction. Put trial frame on S., adjust nose piece and place blank disc before left eye. Point to sev- eral E's in line No. 7. If these are correctly seen the vision is normal and is recorded R. E. I. If they are not seen clear- ly, point to larger E's on lines 6 to 1 recording vision as 8-10 6-10, 4-10, 3-10, 2-10, or 1-10 as indicated on card. If none of the E's can be clearly seen the eye is practically blind and its vision is recorded as—. Now place the +.75 D. lens before the right eye. If this blurs the vision the eye is em- metropic. If it enables S. to see smaller type the eye is hyperopic. To the first re- cord should be added the de- gree of acuity with this lens i. e. V. R. E.=6-10+Hy 8-10. If vision is less than 1 and the +.75 D. lens blurs it, remove the lens, and substitute the

TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING.
b. Binocular Vision.	Trial frame Mad- dox Rod, blank disc and candle.	<p>-.75 D. lens. If the subject can now see smaller type, the eye is myopic and a record of its acuity with this lens should be added i. e. V. R. E=6-10+My 8-10. Remove lens, point to radiating lines at head of test card and ask S. which line looks the blackest. Have him tilt head and ask him whether the same line still looks the blackest. If it does not astigmatism exists and this fact should be added to the record. V. R. E. 6-10+My 8-10+As. Repeat tests using left eye. (Adapted from Whipple.)</p> <p>Place lighted candle 6 meters from S. and on a level with his eyes. Adjust trial frame to center lens. Place blank disc before left eye and Maddox Rod with bar in horizontal direction before right eye. S. should see a long narrow vertical streak of red light. Remove blank disc and tell S. to state at once whether the streak seems to pass through the candle flame. If it does there is no heterophoria. If it is seen to the right of the flame esophoria exists and if to the left exophoria. Now turn the rod until bars run vertically. The streak should now appear in a horizontal direction. Remove disc and streak should be seen as passing through the flame. If it is seen below the flame right hyperphoria exists, if it is seen above, left hyperphoria.</p>

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
c. Fields of vision and of color vision.	Perimeter.	<p>Repeat process using left eye. (Adapted from Whipple.)</p> <p>Cover left eye of S. and place him before perimeter in position to focus with right eye on the little mirror. Place arc of perimeter in horizontal position. Gradually move the small white disc from the extreme right of the arc toward the center and record degree marked on arc when disc is first seen by S. Repeat process bringing disc toward the center from the left, from above, from below and also on the diagonal meridians. Repeat process with the yellow, blue, red and green discs. Using recorded distances, plot a chart of the visual fields for white and for each color. Repeat tests using left eye.</p>
d. Color vision.	Holmgren's Wool Test.	Directions accompanying test material.
e. Visual-perception span.	<p>Nine cards, on each of which are a different number of vertical lines, 2, 3, 4, 5, 6, 7, 8, 9 and 10 respectively.</p> <p>The lines are 5 cms long and 1 cm. apart.</p> <p>Nine cards on each of which appears a different number of groups of two vertical lines each 2, 3,</p>	<p>Expose cards of two series, one at a time, in irregular order, not long enough for subject to count lines, and record the number of lines he thinks he sees and the actual number.</p>



TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
c. Range of tones discernible.	Three. Tuning forks, —50, 200 and 500 vibrations. Rubber topped hammer. Galton Whistle.	<p>above head, back of head, front of head, and on either side. Each time sound is made ask S. where it is and record both correct position and S's answer.</p> <p>The fork of 50 vibrations gives a tone of very low pitch, but one that should be heard by every normal ear. The tone one octave below this is of doubtful audability. The forks of 200 and 500 vibrations gives tones in the middle register. The Galton Whistle gives the highest pitched tones discernible.</p> <p>Sound forks by striking one prong at about <math>\frac{1}{4}</math> distance from the top a clear tap of moderate strength with the hammer.</p>
d. Auditory perception span.	Metal Snapper.	<p>The directions for using the Galton Whistle accompany the instrument.</p> <p>Sound snapper 2, 3, 4, 5, 6, 7, 8, 9 and 10 times. Also group sounds in 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 groups of two sounds each, thus the group of nine will contain 18 sounds. Present these two series in irregular order and record the number of sounds made and the number S. thinks he hears.</p>
3. TACTILE. a. Acuity.	Jastrow's Improved Aesthesiometer.	Seat subject before a table, have him roll his sleeves up above the elbow

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
<p>b. Localization of stimulus.</p>	<p>Jastrow's Improved Aesthesiometer.</p>	<p>and rest forearm on the table volar side uppermost. Show him the aesthesiometer and tell him you are going to touch him sometimes with one point, and sometimes with two, and that he is to pay strict attention and tell whether he is touched with one or two points. Screen arm from his view. Begin with points far apart, (90 mm. on scale), give a ready signal, then bring the points down simultaneously on the middle of the forearm parallel with its longitudinal axis. Let them rest there by their own weight for about two seconds, allowing the holder to slide one or two cm. down the stem of the instrument.</p> <p>Repeat the process, gradually decreasing the distance between the points and occasionally using one point as a check test, until a distance is reached where subject makes 8 correct judgments in 10. This is recorded as his limit for perception of two points on volar surface of arm. This may be repeated on different parts of the body if desired. (Adapted from Whipple.)</p> <p>Seat subject as for previous tests, screen arm and touch with one point of the aesthesiometer various</p>



TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
c. Localiz- ation of direc- tion of moving stimulus.	Jastrow's Improved Aesthesiometer.	places on forearm, asking S. to touch the same spot with the tip of finger. Record amount of error for each judgment and secure an average of ten judgments. Seat subject as for previous test, screen arm and draw point of aesthesiometer over arm from wrist to elbow, from elbow to wrist, from right to left and from left to right. Record S's judgments of the direction of moving touch stimulus.
d. Sensitivity to tickling. 4 PRESSURE	Feather.	Tickle with feather and note muscular reaction.
a. Acuity. (1). Leastdis- cernible dif- ference.	Set of weights all of the same size and material, weighing 10, 11, 12, 15, & 20 gms. respectively.  Set of weights all of the same size and material weighing 100, 101, 102, 105 and 110 gms. respectively.	Use 10 gr. weight as a standard, the others in series as comparison weights. Place 10 gm. weights on S's out stretched palm. Let it remain there for two seconds. Remove it and place comparison weight in its place. Direct S. to say immediately either heavy or light as his judgment of second weight. Repeat process until the standard weight has been compared with the other four twice, once given as first weight of pair, once as last. Record judgments. Repeat process with second series of weights.
(2). Pain Threshold.	Cattell Algometer.	Tell S. that you are going to press the palm of his hand and that he is to tell the first moment that it

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
5. THERMAL: a. Acuity. (1). Least discernible difference.	Thermaesthesiae- siometer.	<p>hurts him, that he is not to speak when it first feels uncomfortable, nor to wait until he can no longer bear the pain, but to tell at once when it begins to cause actual pain. Record pressure indicated by scale. After the first pressure the pain limit will be lowered for that spot.</p> <p>The instrument consists of two thermometers fastened together with electrical arrangements for changing the temperature of one of them. This one is heated until the difference in temperature of the two is about 10 degrees. Both are then placed on the volar surface of forearm and held there until the difference in temperature is imperceptible. The difference, in degrees, of the temperatures of the two thermometers is then recorded as a limit for discrimination of temperature on the forearm.</p>
(2). Pain Threshold for heat.	Thermaesthesiae- siometer.	<p>Increase temperature of thermometer until S. reports that it just causes pain. He must be directed not to speak when it merely feels uncomfortable, nor to wait until he can no longer bear it, but to tell the moment he feels real pain.</p>
6. KINAES- THETIC: Acuity.	Two series of	S. is directed to lift weights

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
	weights as described in tests for acuity of pressure.	with thumb and first finger. A standard weight is placed on table directly in front of him, he lifts it and immediately puts it down. It is at once replaced by another. He lifts this and says heavier or lighter as his judgment of the second weight. The process is then repeated until standard weight has been twice compared with the four others, once as first of pair, once as second. The order of presentation must be varied, i. e. standard must not be used as first of pair with all the weights and then as last with them all.
7. GUSTATORY: Acuity.	Salt, sugar, quinine, vinegar.	Blindfold S., place a little of each on his tongue asking him to describe the taste as sweet, sour, salt or bitter.
8. OLFAC- TORY: Acuity.	Ammonia, assafoedita, tobacco, coffee, cheese, camphor, peppermint, turpentine.	Let S. smell one at a time and name, if possible, if not describe odor.

## Part 2. Reproductive Memory.

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
1. IMMEDIATE MEMORY SPAN		
a. Articulate sound combinations.	Cag, mef, dit, nar, sos, gug, kim, pev, tab.	Recite series of nonsense syllables. Have subject repeat them. Repeat process as many times as proves necessary for S. to learn them. If 9 syllables are beyond S's memory span, reduce number.
b. Visual symbols for articulate sound combinations.	Gaf, zer, pux, rbo, dib, jom, riw, yak, kem.	Have nonsense syllables written plainly on cards and expose series serially. Have subject repeat them. Repeat process until S. has memorized the list. If 9 syllables are beyond S's memory span, reduce the number.
c. Color.	Five skeins of worsted—red, blue, pink, yellow and orange. Skeins of worsted assorted colors.	1. Show skeins of five different colors, then cover them and ask S. to name the colors he has seen. 2. Show skeins of five different colors, cover them and ask S. to pick out five like them from a pile containing skeins of many colors.
d. Musical sound.		Sing or play a few notes of a melody, and ask S. to reproduce it.
e. Form.	Two wooden cubes, cylinders, spheres, pyramids, cones and parallelopipeds.	Show S. cube, cylinder and sphere. Cover them and show him a group of models, among which are duplicates of the first. Ask him to pick out the models just seen.

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
2. RETENT- IVENESS.	Nonsense syllables as given above.	Have subject learn non- sense syllables by method outlined in immediate mem- ory tests, and tell him that you will ask for a recitation on the following day. Note how many have been forgot- ten in the 24 hours, and the number of errors in position of series. If impossible to see S. twice, give immediate memory test early in the interview and call for a rec- itation of syllables at its end.

## Part 3. Apperception.

TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING.
<p>1. PASSIVE APPERCEPTION OR ASSOCIATION.</p> <p>a. Train of thought.</p>	<p>Narrow strips of paper (4 in. by 14 in.) Lead pencil, stop watch.</p>	<p>Supply subject with paper and pencil and direct him to write a list of words, one word on each line; to write EVERY word that comes into his head without pause or selection. Impress upon him that he is to make no choice of words, but to write whatever comes to his mind and to write it as quickly as he can. Have him write for fifteen minutes and note his progress at the end of each five minute period. If S. can not write have him dictate them. The subsequent analysis of such a list gives much data on the quality and rate of thought, the mode of association and mental content. Full directions for such analysis are too technical to be given here.</p>
<p>b. Word reactions.</p>	<p>A list of 100 words.</p> <ol style="list-style-type: none"> <li>1. dog</li> <li>2. hand</li> <li>3. ocean</li> <li>4. friend</li> <li>5. spring</li> <li>6. wrong</li> <li>7. case</li> <li>8. gun</li> <li>9. custom</li> <li>10. enjoyment</li> <li>11. despise</li> <li>12. home</li> </ol>	<p>The words are used as stimuli. S. is instructed that when he hears a word he is to say AT ONCE the word that it brings up in his mind. Before pronouncing the stimulus word a ready signal should be given. The reaction word is recorded also the time which elapses between the utterance of the stimulus word and the utterance of the response.</p>

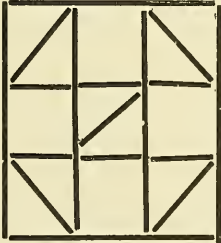
TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING.
	13. reward 14. theatre 15. clean 16. freedom 17. yellow 18. bird 19. money 20. sleepy 21. music 22. blood 23. dream 24. plant 25. hesitate 26. funny 27. secret 28. number 29. beauty 30. happy 31. tree 32. electricity 33. man 34. jewel 35. needle 36. butterfly 37. time 38. fire 39. news 40. crime 41. picture 42. copper 43. death 44. sport 45. creator 46. long 47. people 48. silk 49. medicine 50. future 51. American 52. poverty 53. laugh 54. good	<p>For exact time results it is necessary to have some form of apparatus which will mechanically register when the stimulus word and the response words are uttered. A satisfactory method is to obtain an electric response to the spoken words by means of a very delicate telephone transmitter and relay, a Pfeil signal recording on a Kymograph. A time line simultaneously marks on the Kymograph. 1-10 seconds intervals. For less exact time results a stop watch recording 1-5 seconds is used. This is a crude and inaccurate method, but is often useful when access to a laboratory and appropriate apparatus is impossible.</p>

TESTS.	MATERIALS REQUIRED	DIRECTIONS FOR TESTING.
	55. recreation	
	56. lover	
	57. country	
	58. above	
	59. ship	
	60. dance	
	61. constant	
	62. table	
	63. coat	
	64. business	
	65. pain	
	66. stupid	
	67. work	
	68. youth	
	69. knife	
	70. lily	
	71. power	
	72. face	
	73. Christian	
	74. forget	
	75. meeting	
	76. key	
	77. innocent	
	78. mother	
	79. square	
	80. loss	
	81. travel	
	82. suggestion	
	83. nurse	
	84. true	
	85. danger	
	86. success	
	87. name	
	88. story	
	89. hypnotist	
	90. late	
	91. nature	
	92. tired	
	93. grow	
	94. call	
	95. life	
	96. drink	



TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING
	97. marriage 98. trick 99. crowd 100. woman Time recording apparatus: (1.) Chronoscope. (2.) Kymograph, metronome with electric contact, set to make contact every 1-10 second. (3.) Stop watch ne Telephone connections for use with either chronoscope or Kymograph, two Pfeil signal.	
c. Emotional reaction.		
(1.) Superficial.	Pictures designed to provoke mirth, sorrow, sympathy, anger and fear.	Show pictures and note emotional reaction as betrayed in facial expression, speech and manner.
(1.) Physiological changes accompanying emotional states.	Phethysmograph Sphygmograph Pneumograph Kymograph Rubber tubing, tam-bours, Pfeil signal and other accessories.	Secure Phethysmograms, sphygmograms and pneumograms from subject while he is experiencing some emotional excitement, and note character of curves, comparing with those obtained in passive state. As these tests can only be made by one experienced in the technique of such experimental work, description of method is not given.
2. ACTIVE APPERCEPTION.		
a. Sustained attention to intellectual work.	12 columns of ten one place numbers.	Direct subject to add columns as quickly as possible. Record time and errors.
b. Voluntary	Similar materials as	Repeat former tests read-

TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING.
attention.	those used in previous tests.	ingortalkingtosubjectwhile he is counting. Record time and errors and compare with the results of previous experiment.
c. Attention to disparate activities.	Some reading matter, paper, pencil, and stop watch.	Direct subject to read aloud for 30 sec. Record number of words read, then have him read for same length of time new matter of same degree of difficulty and write simultaneously as many a's as possible. Continue this process using new reading matter each time, and each time adding one or more letters until subject's limit is reached. Record number of errors made in the writing and number of words read. Subject must read and write continuously, not write in pauses of reading. It is possible to write the whole alphabet without error and without pause in reading.
d. Discriminative attention.	A. blanks. These contain lines of printed letters, arranged without definite order and contain among them 100 A's. QRST. Blanks. (Stoelting & Co., Chicago.)	Give subject blank and direct him to mark out with pencil every A. Record time, errors and omissions.
e. Active imagination.	(1. Linguistic.	Same directions, substituting qrst for a.
	Prepared blanks containing mutilated texts, (words and parts of words omitted.) (Stoelting & Co., Chicago.)	Give subject blank and direct him to fill in omissions as quickly as possible. Record time and errors, also note confidence and intelligence.

TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING.
(2.) Inven- tion.	<p>Three words: citizen, horse, decree, (nouns) Remember, put, depart (verbs).</p> <p>Problem: A man has five short chains of three links each. Show how he can put these five pieces together into one long chain by using only three weldings. Five wire chains of 3 links each. (Terman.)</p>	<p>Write as many sentences containing the three words, citizen, horse, decree, as is possible in five minutes.</p> <p>The same, substituting remember, put, depart. The three words must appear in each sentence.</p> <p>Place before S. the five small chains. Have him solve problem. Record time and stages of process.</p>
f. Reason.	<p>(1) <math display="block">\begin{array}{r} 9xx \quad 4xxx4x7 \quad (xxxx \\ \quad \quad \quad x9xx \\ \hline \quad \quad \quad x1xx \\ \quad \quad \quad 4xx5 \\ \hline \quad \quad \quad 2x7x \\ \quad \quad \quad xxx4 \\ \hline \quad \quad \quad x0x \end{array}</math></p> 	<p>Have subject solve problem, supply numbers for all the x's without changing any of the given figures. Record time and method of procedure.</p> <p>Direct subject to trace this figure without taking pencil off or over a line twice. Note time and number of failures, also method of procedure.</p>

TESTS.	MATERIALS REQUIRED.	DIRECTIONS FOR TESTING
	<p>(3.) Problem: A ball is lost in a round field where the grass is so tall that you can only see ten feet on each side of you. Show what path you would take in looking for the ball.</p> <p>(Terman).</p> <p>Pencil and paper.</p>	<p>Direct subject to solve problem illustrating his findings. Record time and method.</p>

**Part 4. Volitional Motor Ability.**

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
<b>1. CONTROL OF MUSCLES WHILE IN FIXED POSITION</b> a. Body.	Ataxiograph.	<p>A skull cap topped with a light board on which is fastened a sheet of paper is placed on the head of subject. He then stands under a projecting metal rod to which is fastened, pointing downward a pencil. The height of rod is adjustable and must be fixed for each subject at such a height that the pencil point just touches the paper. S. is instructed to stand perfectly still, and any swaying will be traced on paper. Time of test 60 seconds.</p>
b. Hand and arm.	Steadiness tester. (Whipple) Kymograph and connecting apparatus.	<p>Instrument consists of a brass plate pierced by nine holes, varying in size. Subject holds a metallic needle in holes during a period of 15 seconds. The instrument is so connected with electric sounder and writing lever that each time the needle touches the rim of hole, a sound is made and the lever records on the revolving drum of a kymograph. Begin with largest hole and test control first with right hand, then with left, allow 30 seconds rest, then repeat with next size hole. Continue until a hole is reached</p>

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
2. ACCURACY OF MOVEMENT:	Prepared blanks containing ten crosses irregularly arranged. (Whipple) Metronome.	<p>which is the limit of S's ability. This instrument may be used to test control of arm and hand, or hand alone by varying position of arm and supporting it at various points.</p> <p>Mount blanks on board with name space in lower right hand corner and hang it on wall in a line with S's shoulder. Let S. stand with right shoulder in front of target at such a distance that his pencil just touches target when his arm is extended. Set metronome at 69 and tell S. he is to strike at target in time with the beat of the metronome, striking on one beat, bringing back pencil until it touches shoulder on next beat, then striking again. He is to aim at each cross once beginning with the one in upper left hand corner and continuing in regular order until tenth is reached. This process is twice repeated, but in the second round the order is reversed. Repeat process with left hand using a fresh blank. Measure errors with mm. rule and find the averages and mean variations. S. should be given a little practice before experiment is begun.</p>
3. STEADINESS OF	1. Tracing board. (Whipple).	On tracing board are two strips of metal placed to

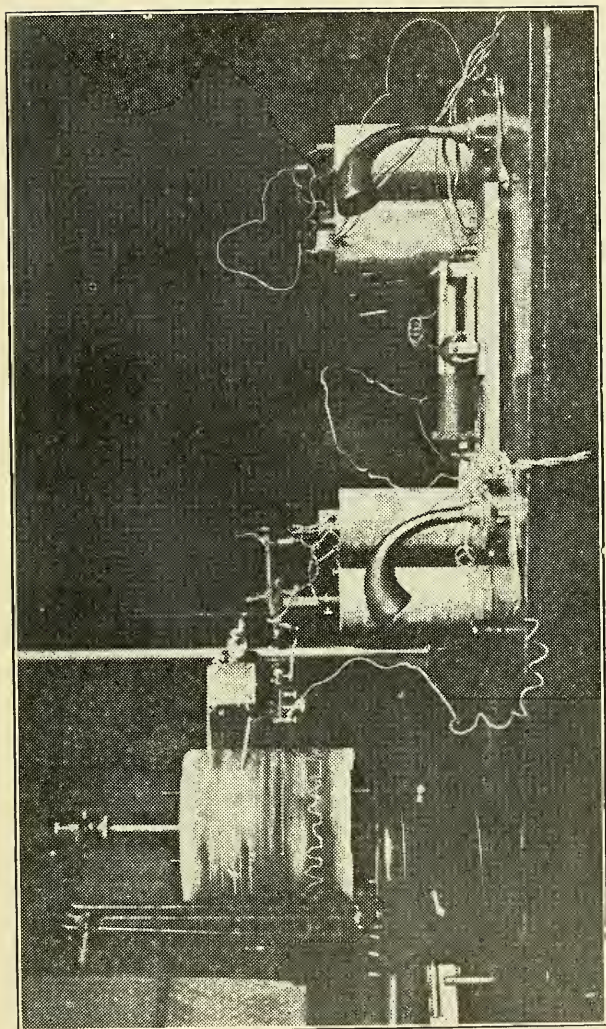
TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
MOVEMENT.	Kymograph and connecting apparatus.	<p>form narrow slit between. Metallic stylus is held in hand, wrist and arm unsupported, S. draws a line with it on the glass between strips of metal. The instrument is so connected with electric sounder and writing lever, that each time the stylus touches the metal a sound is made and a record made on the kymograph. Nine seconds are allowed for complete tracing. Allow three preliminary trials to accustom S. to the rate of movement desired. As soon as a contact is made, S. stops, and begins again with other hand. Five trials are made with each hand. Movements may be made toward or away from the S. from right to left, or from left to right. Variations in test may be made by supporting arm at elbow or at wrist.</p>
	2. Maze blanks, (Columbia University.)	<p>In using Maze blanks, have S. draw a line between the parallel lines on blank. The line must be continuous and be a free arm movement. Record number of times line touches either printed line.</p>
4. RATE OF MOVEMENT.	Telegraph key. Two Pfeil signals, Seconds pendulum or other apparatus so arranged as to give electric contact once a second or	<p>Seat subject at table, let forearm rest comfortably on the table and hand be in position to tap telegraph key. Have key connected with Pfeil signal in such a</p>

TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
5. FATIGUE MUSCULAR.	oftener. Kymograph.	manner that at every tap a record is made on the revolving drum of Kymograph. Have pendulum connected with other signal in such a way that a record is made every second. The combined records will show how many taps are made per second. Have S. tap for 30 seconds. Test both hands, having S. use index finger.
	Ergograph, kymograph, metronome.	Place right arm of subject in arm rest adjust weight to suit subject, choosing one which is quite heavy for him to lift (7 per cent of subject's weight is given by Whipple). Set metronome to give one stroke per second and instruct S. to pull weight up on one stroke and release it on the next. This will give one lift in two seconds. Instruct S. to continue until he is unable to pull weight. Let him rest 5 min. and repeat process, rest 5 min. more and repeat again. The writing lever of the ergograph registers the extent of each pull on the revolving drum of the kymograph. The extent is also measured by the endless tape attached to ergograph. Multiplying the weight used by the tape record will give the amount of work done, and the graphic record will show the rate of fatigue.



TESTS	MATERIALS REQUIRED	DIRECTIONS FOR TESTING
<p>6. REACTION TIME.</p> <p>a. Simple reactions.</p> <p>(1.) Light.</p> <p>(2.) Sound.</p> <p>(3.) Touch.</p> <p>(4.) Electricity.</p>	<p>Chronoscope.</p> <p>Apparatus for producing stimuli of the kinds noted.</p> <p>Telegraph key.</p>	<p>Apparatus for producing stimuli, and the telegraph key are connected with chronoscope in such a manner that chronoscope begins to record when stimulus is produced and ceases when reaction is made. Thus a reading of the dial will give time that has elapsed between production of stimulus and S's reaction. Two signals are given before production of stimulus, "Ready" to warn subject to attend and "Now" immediately before presentation. The reaction consists in pressing telegraph key. Subject is directed to press key as soon as he perceives the stimulus. He is told what kind of stimulus will be presented.</p>
<p>b. Compound reactions.</p> <p>(1.) Discrimination.</p>		<p>DISCRIMINATION. Subject is told that either of two stimuli will be given, and that he is to react to one only which is designated. For instance either black or white will be shown and he must react only to white.</p>
<p>(2.) Choice.</p>		<p>CHOICE. Subject is told that either of two stimuli will be given, that he is to react to both but with different fingers, for instance if white appears he is to touch key with first finger, if black with second.</p>
<p>(3.) Cognition.</p>		<p>COGNITION. A more com-</p>

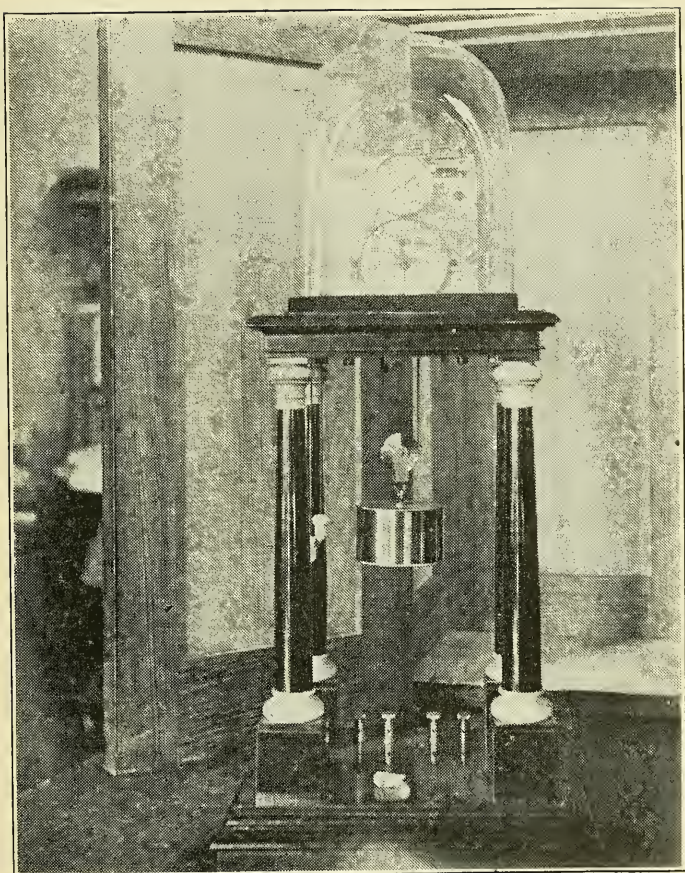
TESTS	MATERIALS REQUIRED	DIRECTION FOR TESTING
		licated stimulus is given for this, a word or something which S. will have to identify. He is directed not to touch the key until he identifies stimulus.



Groups of apparatus used in recording word association reaction time. It includes two telephone transmitters connected by means of relay and induction coil with electric marker, a Jaquet Chronometer for recording one second intervals, and a Kymograph. The drum of the Kymograph is covered with smoked paper, and as it revolves, a time line is traced by the writing pen of the Chronometer, and under it the electric marker records each time a word is spoken by experimenter and subject.



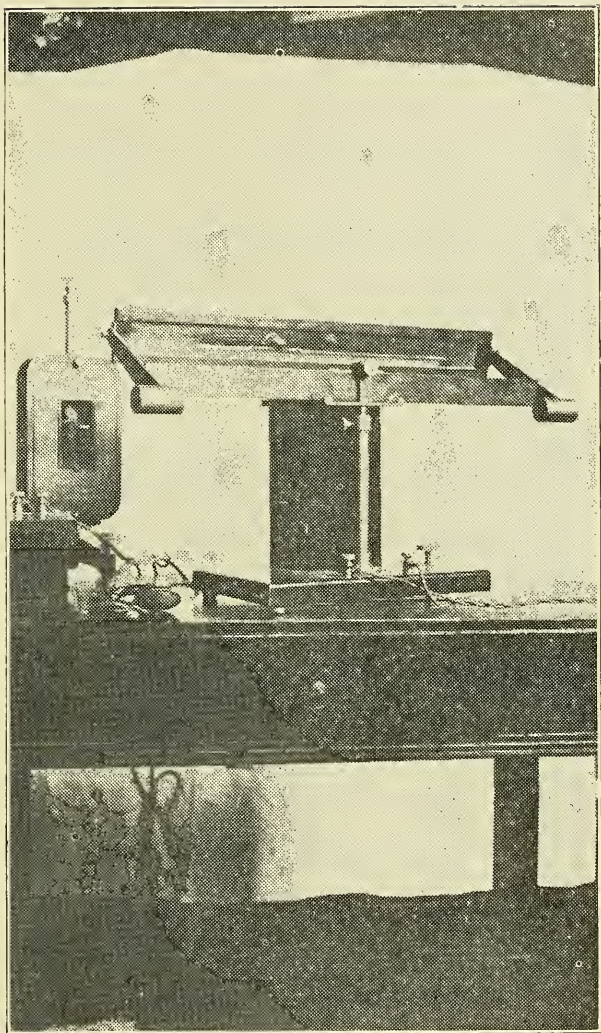




### HIPP CHRONOSCOPE

Used in Reaction Time Experiments. Unit of Measurement 1-1000 Sec.





Group of Apparatus used in recording the psycho-galvanic reaction. It includes a galvanometer, hand electrodes, and resistance box; also lantern, scale and mirror by which movement of coil is magnified and measured.











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